REMARKS

Status of the Claims

Claims 17-27 were pending and rejected. Claim 17 was an independent claim. Claims 18 -27 depended on independent claim 17.

Claims 17, 21, 22, 23 have been **amended**, claims 20, 24-27 have been deleted. Claims 17-19, 21-23 are pending.

Double Patenting

Claim 17, 21, 23 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 9-12 of US Patent No. 6,646,964.

Please find enclosed a terminal disclaimer signed by attorney of record, Trueman H. Denny, Reg. No. 44,652.

Claim rejection under 35USC112 second paragraph.

Claims 17-27 are rejected under 35 USC 112, first paragraph, as directed to a single means which covered every conceivable means for achieving the stated purpose was held nonenabling for the scope of the claim because the specification disclosed at most only those means know to the inventor.

The Examiner stated "claim 17 is directed to a single means claim because there is only one limitation "applying harmonic correction to the phase-locked loop" is recited in these claims for performing all the functions."

Claims 17, 21, 22, 23 have been amended. In their present status, claims 17, 21, 22, 23 are method claims that include more than a single step.

Claim rejection under 25USC102

Claims 17, 18, 26 were rejected under 35USC102(b) as being anticipated by Sakata et al (US 5,231,507).

The Examiner stated "Sakata et al., according to Figs. 2-16, shows an optical head comprising all features of the claimed invention.

Regarding claim 17, 18 and 26, the Examiner stated that Sakata et al. shows an optical head comprising all features of the claimed invention. The Examiner further stated that Figs. 2 and 3 show in a removable disk having harmonic disturbance induced by rotation of the media (vibration due to jitters caused by rotation of medium), reading means for reading a signal from media, a phase-locked loop connected to the reading means, the phase-locked loop recovering a reference signal from a signal on the media, and the method of reducing harmonic disturbance (Filter 132, 136, 140) for recording the effects of harmonic disturbance on the phase-locked loop.

Regarding claim 18, the Examiner stated that filter 132, 136 or 142 in Fig. 2 is interpreted as the harmonic connector is applied to the phase-locked loop continuously.

Regarding claim 26, the Examiner stated that the phase comparator in Fig. 2 can be interpreted as a mixer as recited in the claims.

Amended claim 17 includes the following features:

reading means for reading a signal from the media,

a phase-locked loop connected to the means for reading, the phase locked-loop recovering a reference signal from the signal on the media, and

a harmonic corrector for reducing the effects of harmonic disturbance on the phase-locked loop, wherein the harmonic corrector comprises a notch

> filter connected between the reading means and the phase-locked loop, the notch filter filtering desired harmonic content.
>
> (Emphasis Added)

Applicants respectfully disagree with the Examiner's rejection for the following reasons:

1. **All claim limitations must be considered especially when missing from the prior art.**

The mere absence [from the reference] of an explicit requirement [of the claim] cannot reasonable be construed as an affirmative statement that [the requirement is in the reference]. *In re Evanega*, 829 F.2d 1110, 4 USPQ2d 1249 (Fed. Cir. 1987).

A. Sakata does not recognize that harmonic distortion can be introduced by a misalignment of the center of a disk.

> Sakata states (column 7, lines 58-62) "...with the signal read out by using a predetermined clock signal, time base correction (TBC) is eventually accomplished and any jitters that result from uneven rotation of the magnetic disk can be removed from the reproduced video signal."

The fundamental reason for including a phase-locked loop is to allow synchronized reading and writing from the rotating disk in spite of the imperfections of a rotating disk.

> As stated in the specification of the present application (page 2, lines 5-12), "In a storage device using a rotating storage medium, the act of reading or writing data necessitates the generation of a clock signal to keep the data synchronized. Furthermore, the clock must be synchronized to the rotating medium itself, so that the data can be repeatably positioned on, and recovered from, the storage

medium. In order to generate a clock for reading and writing, it is common to use a phase-locked loop which generates a repeatable clock with uses as its input a reference signal measured from the rotating medium.

Imperfections of a rotating disk introduce many types of errors. For example, uneven rotation can introduce distortion such as frequency jitter and phase jitter. Phase-locked loops are used to correct distortion that includes frequency components that are within the loop bandwidth of the phase-locked loop.

Sakata generally categorizes these distortions as "jitter" without specifically recognizing harmonic distortion.

B. Sakata does not teach or suggest a notch filter, the notch filter filtering desired harmonic content.

Sakata does not recognize harmonic distortion of with the phase-locked. Therefore, there is absolutely no suggestion of including a notch-filter for filtering the harmonic distortion.

Sakata include three loop filters. The function of these filter are each specifically described. These filters each provide specific functions---none of which include filtering of harmonic frequency content.

1. The BPF 132 is described in column 6, lines 53-56, and column 8, lines14-17. As stated, "... a band pass filter (BFP) 132 which is arranged to have the frequency of the sync tip part set at the center of its passing band ...". Clearly, this filter cannot be construed as a notch filter for filtering harmonic content.
2. The LPF 136 is described in column 6, lines 57-59, and column 8, lines 27-28. As stated, "...a low pass filter (LPF) 136 which is arranged to take out only an

error signal produced from the above stated phase comparator...." Clearly, this filter cannot be construed as a notch filter for filtering harmonic content.

3. The loop filter 140 is described in column 6, line 62, and column 8, lines 39-43. As stated, "...The error signal which is thus sampled and held is phase-corrected by the loop filter 140 of the PLL circuit ..." Phase correction is very different than harmonic frequency filtering. Clearly, this filter cannot be construed as a notch filter for filtering harmonic content.

2. There is no suggestion in the prior art to modify it such as to produce Appellant's claimed invention.

"The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch,* 23 USPQ2d 1780, 1783 (CAFC 1992); see also, *In re Gal,* 25 USPQ2d 1076 (CAFC 1992); *In re Jansson,* 203 USPQ 976 (CCPA 1979).

As described above, there are differences between the Applicant's claimed invention and the teachings in the Sakata patent. For none of the differences does Sakata suggest the required modifications.

Sakata does not provide a notch filter. Sakata does not suggest filtering of harmonic content. There is absolutely no suggestion within Sakata to provide filtering of harmonic content by a notch filter.

In summary, Sakata does not recognize harmonic distortion, Sakata does not provide additional signal processing based upon the harmonic distortions, and Sakata does not correct for harmonic distortion based upon the additional signal processing.

Amended independent claim 17 is patentable over the cited reference. Claims 18, 19 are dependent upon claim 17. Therefore, claims 18, 19 are patentable.

Amended claim 21 includes the following features:

reading a signal from a rotating media;

recovering a reference signal from the rotating media with the phase-locked loop;

adding a resonant filter to the phase locked loop, the resonant filter increasing the loop gain of the phase-locked loop at a harmonic disturbance, the harmonic disturbance being induced by rotation of the media.

(Emphasis Added)

1. All claim limitations must be considered especially when missing from the prior art.

The mere absence [from the reference] of an explicit requirement [of the claim] cannot reasonable be construed as an affirmative statement that [the requirement is in the reference]. *In re Evanega*, 829 F.2d 1110, 4 USPQ2d 1249 (Fed. Cir. 1987).

A. Sakata does not recognize that harmonic distortion can be introduced by a misalignment of the center of a disk.

Sakata states (column 7, lines 58-62) "...with the signal read out by using a predetermined clock signal, time base correction (TBC) is eventually accomplished and any jitters that result from uneven rotation of the magnetic disk can be removed from the reproduced video signal."

The fundamental reason for including a phase-locked loop is to allow synchronized reading and writing from the rotating disk in spite of the imperfections of a rotating disk.

> As stated in the specification of the present application (page 2, lines 5-12), "In a storage device using a rotating storage medium, the act of reading or writing data necessitates the generation of a clock signal to keep the data synchronized. Furthermore, the clock must be synchronized to the rotating medium itself, so that the data can be repeatably positioned on, and recovered from, the storage medium. In order to generate a clock for reading and writing, it is common to use a phase-locked loop which generates a repeatable clock with uses as its input a reference signal measured from the rotating medium.

Imperfections of a rotating disk introduce many types of errors. For example, uneven rotation can introduce distortion such as frequency jitter and phase jitter. Phase-locked loops are used to correct distortion that includes frequency components that are within the loop bandwidth of the phase-locked loop.

Sakata generally categorizes these distortions as "jitter" without specifically recognizing harmonic distortion.

B. Sakata does not teach or suggest a resonant filter increasing the loop gain of the phase-locked loop at the harmonic disturbance.

> Sakata does not recognize harmonic distortion of with the phase-locked. Therefore, there is absolutely no suggestion of including a resonant filter increasing the loop gain of the phase-locked loop at the harmonic disturbance.
>
> Sakata include three loop filters. The function of these filter are each specifically described. These filters each provide specific functions---none of which include increasing the loop gain of the phase-locked loop at the harmonic disturbance.

1. The BPF 132 is described in column 6, lines 53-56, and column 8, lines14-17. As stated, "... a band pass filter (BFP) 132 which is arranged to have the frequency of

the sync tip part set at the center of its passing band ...". Clearly, this filter cannot be construed as a notch filter for filtering harmonic content.

2. The LPF 136 is described in column 6, lines 57-59, and column 8, lines 27-28. As stated, "...a low pass filter (LPF) 136 which is arranged to take out only an error signal produced from the above stated phase comparator...." Clearly, this filter cannot be construed as a notch filter for filtering harmonic content.
3. The loop filter 140 is described in column 6, line 62, and column 8, lines 39-43. As stated, "...The error signal which is thus sampled and held is phase-corrected by the loop filter 140 of the PLL circuit ..." Phase correction is very different than harmonic frequency filtering. Clearly, this filter cannot be construed as a notch filter for filtering harmonic content.

2. There is no suggestion in the prior art to modify it such as to produce Appellant's claimed invention.

"The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch,* 23 USPQ2d 1780, 1783 (CAFC 1992); see also, *In re Gal,* 25 USPQ2d 1076 (CAFC 1992); *In re Jansson,* 203 USPQ 976 (CCPA 1979).

As described above, there are differences between the Applicant's claimed invention and the teachings in the Sakata patent. For none of the differences does Sakata suggest the required modifications.

Sakata does not suggest filtering of harmonic content. There is absolutely no suggestion within Sakata to provide filtering of harmonic content by increasing the loop gain of the phase-locked loop at the harmonic disturbance.

In summary, Sakata does not recognize harmonic distortion, Sakata does not provide additional signal processing based upon the harmonic distortions, and Sakata does not correct for harmonic distortion based upon the additional signal processing.

Amended independent claim 21 is patentable over the cited reference.

Amended claim 22 includes the following features:

reading a signal from a rotating media;

recovering a reference signal from the rotating media with the phase-locked loop;

generating a sinusoid at a same phase and frequency as a harmonic disturbance, the harmonic disturbance being induced by rotation of the media, and

feeding forward the generated sinusoid so as to cancel the harmonic disturbance.

(Emphasis Added)

1. All claim limitations must be considered especially when missing from the prior art.

The mere absence [from the reference] of an explicit requirement [of the claim] cannot reasonable be construed as an affirmative statement that [the requirement is in the reference]. *In re Evanega*, 829 F.2d 1110, 4 USPQ2d 1249 (Fed. Cir. 1987).

A. Sakata does not recognize that harmonic distortion can be introduced by a misalignment of the center of a disk.

Sakata states (column 7, lines 58-62) "...with the signal read out by using a predetermined clock signal, time base correction (TBC) is eventually

> accomplished and any jitters that result from uneven rotation of the magnetic disk can be removed from the reproduced video signal."

The fundamental reason for including a phase-locked loop is to allow synchronized reading and writing from the rotating disk in spite of the imperfections of a rotating disk.

> As stated in the specification of the present application (page 2, lines 5-12), "In a storage device using a rotating storage medium, the act of reading or writing data necessitates the generation of a clock signal to keep the data synchronized. Furthermore, the clock must be synchronized to the rotating medium itself, so that the data can be repeatably positioned on, and recovered from, the storage medium. In order to generate a clock for reading and writing, it is common to use a phase-locked loop which generates a repeatable clock with uses as its input a reference signal measured from the rotating medium.

Imperfections of a rotating disk introduce many types of errors. For example, uneven rotation can introduce distortion such as frequency jitter and phase jitter. Phase-locked loops are used to correct distortion that includes frequency components that are within the loop bandwidth of the phase-locked loop.

Sakata generally categorizes these distortions as "jitter" without specifically recognizing harmonic distortion.

B. Sakata does not teach or suggest a feedforward corrector comprising means for generating a sinusoid at a phase and frequency so as to cancel the harmonic disturbance.

> Sakata does not recognize harmonic distortion of with the phase-locked. Therefore, there is absolutely no suggestion of including a feedforward corrector comprising means for generating a sinusoid at a phase and frequency so as to cancel the harmonic disturbance

Sakata include three loop filters. The function of these filter are each specifically described. These filters each provide specific functions---none of which include a feedforward corrector comprising means for generating a sinusoid at a phase and frequency so as to cancel the harmonic disturbance

1.The BPF 132 is described in column 6, lines 53-56, and column 8, lines14-17. As stated, "... a band pass filter (BFP) 132 which is arranged to have the frequency of the sync tip part set at the center of its passing band ...". Clearly, this filter cannot be construed as a notch filter for filtering harmonic content.

2. The LPF 136 is described in column 6, lines 57-59, and column 8, lines 27-28. As stated, "...a low pass filter (LPF) 136 which is arranged to take out only an error signal produced from the above stated phase comparator...." Clearly, this filter cannot be construed as a notch filter for filtering harmonic content.
3. The loop filter 140 is described in column 6, line 62, and column 8, lines 39-43. As stated, "...The error signal which is thus sampled and held is phase-corrected by the loop filter 140 of the PLL circuit ..." Phase correction is very different than harmonic frequency filtering. Clearly, this filter cannot be construed as a notch filter for filtering harmonic content.

2. There is no suggestion in the prior art to modify it such as to produce Appellant's claimed invention.

"The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch,* 23 USPQ2d 1780, 1783 (CAFC 1992); see also, *In re Gal,* 25 USPQ2d 1076 (CAFC 1992); *In re Jansson,* 203 USPQ 976 (CCPA 1979).

As described above, there are differences between the Applicant's claimed invention and the teachings in the Sakata patent. For none of the differences does Sakata suggest the required modifications.

Sakata does not suggest filtering of harmonic content. There is absolutely no suggestion within Sakata to provide feedforward corrector comprising means for generating a sinusoid at a phase and frequency so as to cancel the harmonic disturbance.

In summary, Sakata does not recognize harmonic distortion, Sakata does not provide additional signal processing based upon the harmonic distortions, and Sakata does not correct for harmonic distortion based upon the additional signal processing. Even if Sakata did teach additional signal processing based upon the harmonic distortions, Sakata still does not suggest generating a sinusoid at a phase and frequency so as to cancel the harmonic disturbance.

Amended independent claim 22 is patentable over the cited reference.

Amended claim 23 includes the following features:

reading a signal from a rotating media;

recovering a reference signal from the rotating media with the phase-locked loop;

collecting residual errors from a harmonic disturbance over one or more rotations of the media, the harmonic disturbance being induced by rotation of the media,

filtering the residual errors, and

feeding forward the filtered residual errors.

1. All claim limitations must be considered especially when missing from the prior art.

The mere absence [from the reference] of an explicit requirement [of the claim] cannot reasonable be construed as an affirmative statement that [the requirement is in the reference]. *In re Evanega*, 829 F.2d 1110, 4 USPQ2d 1249 (Fed. Cir. 1987).

A. Sakata does not recognize that harmonic distortion can be introduced by a misalignment of the center of a disk.

> Sakata states (column 7, lines 58-62) "...with the signal read out by using a predetermined clock signal, time base correction (TBC) is eventually accomplished and any jitters that result from uneven rotation of the magnetic disk can be removed from the reproduced video signal."

The fundamental reason for including a phase-locked loop is to allow synchronized reading and writing from the rotating disk in spite of the imperfections of a rotating disk.

> As stated in the specification of the present application (page 2, lines 5-12), "In a storage device using a rotating storage medium, the act of reading or writing data necessitates the generation of a clock signal to keep the data synchronized. Furthermore, the clock must be synchronized to the rotating medium itself, so that the data can be repeatably positioned on, and recovered from, the storage medium. In order to generate a clock for reading and writing, it is common to use a phase-locked loop which generates a repeatable clock with uses as its input a reference signal measured from the rotating medium.

Imperfections of a rotating disk introduce many types of errors. For example, uneven rotation can introduce distortion such as frequency jitter and phase jitter. Phase-locked loops are used to correct distortion that includes frequency components that are within the loop bandwidth of the phase-locked loop.

Sakata generally categorizes these distortions as "jitter" without specifically recognizing harmonic distortion.

Sakata does not teach or suggest a means for collecting residual errors from the harmonic disturbance on one or more rotations of the media, means for filtering the residual errors, and means for feeding forward the filtered residual errors.

Sakata does not recognize harmonic distortion of with the phase-locked. Therefore, there is absolutely no suggestion of including a means for collecting residual errors from the harmonic disturbance on one or more rotations of the media, means for filtering the residual errors, and means for feeding forward the filtered residual errors.

Sakata include three loop filters. The function of these filter are each specifically described. These filters each provide specific functions---none of which include means for collecting residual errors from the harmonic disturbance on one or more rotations of the media, means for filtering the residual errors, and means for feeding forward the filtered residual errors.

1. The BPF 132 is described in column 6, lines 53-56, and column 8, lines14-17. As stated, "... a band pass filter (BFP) 132 which is arranged to have the frequency of the sync tip part set at the center of its passing band ...". Clearly, this filter cannot be construed as a notch filter for filtering harmonic content.
2. The LPF 136 is described in column 6, lines 57-59, and column 8, lines 27-28. As stated, "...a low pass filter (LPF) 136 which is arranged to take out only an error signal produced from the above stated phase comparator...." Clearly, this filter cannot be construed as a notch filter for filtering harmonic content.
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harmonic frequency filtering. Clearly, this filter cannot be construed as a notch filter for filtering harmonic content.

2. There is no suggestion in the prior art to modify it such as to produce Appellant's claimed invention.

"The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch,* 23 USPQ2d 1780, 1783 (CAFC 1992); see also, *In re Gal,* 25 USPQ2d 1076 (CAFC 1992); *In re Jansson,* 203 USPQ 976 (CCPA 1979).

As described above, there are differences between the Applicant's claimed invention and the teachings in the Sakata patent. For none of the differences does Sakata suggest the required modifications.

Sakata does not suggest filtering of harmonic content. There is absolutely no suggestion within Sakata to provide filtering of harmonic content by collecting residual errors from the harmonic disturbance on one or more rotations of the media, means for filtering the residual errors, and means for feeding forward the filtered residual errors.

In summary, Sakata does not recognize harmonic distortion, Sakata does not provide additional signal processing based upon the harmonic distortions, and Sakata does not correct for harmonic distortion based upon the additional signal processing. Even if Sakata did teach additional signal processing based upon the harmonic distortions, Sakata still does not suggest filtering of harmonic content by collecting residual errors from the harmonic disturbance on one or more rotations of the media, means for filtering the residual errors, and means for feeding forward the filtered residual errors.

Amended independent claim 23 is patentable over the cited reference.

No new matter has been added by these amendments.

Applicants respectfully suggest that each of the claims presently in the application are distinct over the prior art and that the application is now in condition for allowance. Accordingly, Applicants request that the restriction/election requirement be withdrawn and the claims be allowed.

Respectfully submitted
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